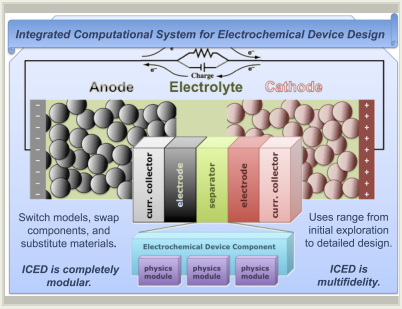
Integrated Computational System for Electrochemical Device Design and Simulation, Phase II

Completed Technology Project (2015 - 2017)

Project Introduction

During the Phase I project, major portions of a base, open-source, easily extensible battery modeling system have been developed with a modern, modular architecture and methods. In addition to the new modules and architecture built by Illinois Rocstar, we have identified a number of available tools that fit well with our vision of the final ICED product. Open-source tools from the Oak Ridge National Laboratory CAEBAT project and proprietary, but government-funded tools from the Idaho National Laboratory (INL) will be modularized and brought into the ICED system, ensuring that the Phase II value we bring to NASA is focused on developing new capabilities such as predictive tortuosity modeling, while assembling a tool that contains the most advanced battery modeling capabilities available. Advanced science and modeling tools are rarely accepted by industry without (i) support behind them and (ii) ease of installation and use. Thus, we are focusing on bringing scientific software to industry in forms where commercial-quality, easily installed, and graphically-interfaced tools are needed by those who have no interest in developing software, and providing open-source source code to those that want it. We focus on generating predictive, advanced scientific tools to bear on problems of national interest. We bring a commercially-supported environment to the table for them, which is a service that the national laboratories cannot provide themselves. In the end, we will produce a significant advance in areas of battery modeling, while integrating multiple tools across other sources using our open-source Illinois Rocstar Multiphysics Application Coupling Toolkit (IMPACT). Our business model for providing this software to industry, government, and academia is significantly different than how most larger simulation software companies operate, and we believe has a significant value proposition to all parties that can benefit from advanced battery modeling and simulation.



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Small Business Innovation Research/Small Business Tech Transfer

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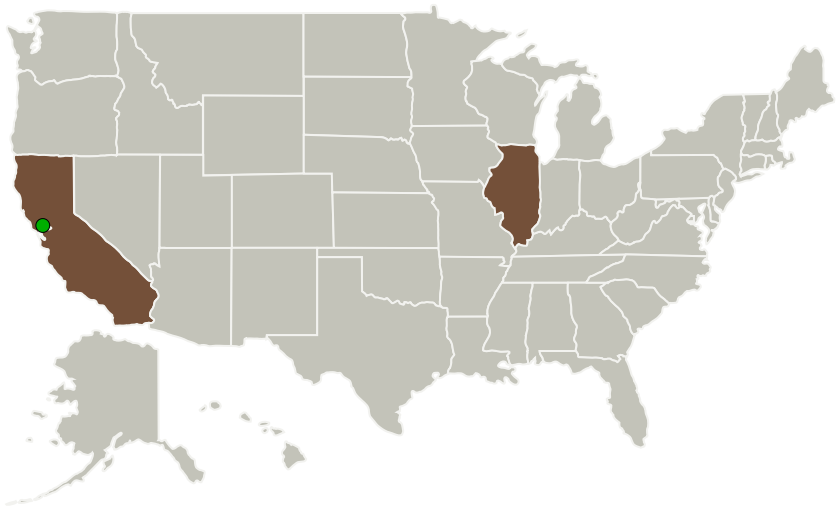
Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
IllinoisRocstar, LLC	Lead Organization	Industry	Champaign, Illinois
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	Illinois

Project Transitions

May 2015: Project Start

May 2017: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137586)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

IllinoisRocstar, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

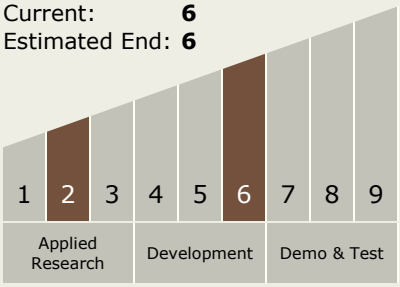
Carlos Torrez

Principal Investigator:

Lipeng Sun

Technology Maturity (TRL)

Start: **2**
Current: **6**
Estimated End: **6**



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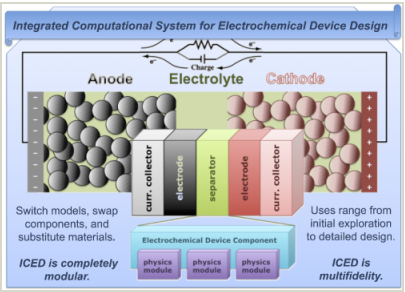
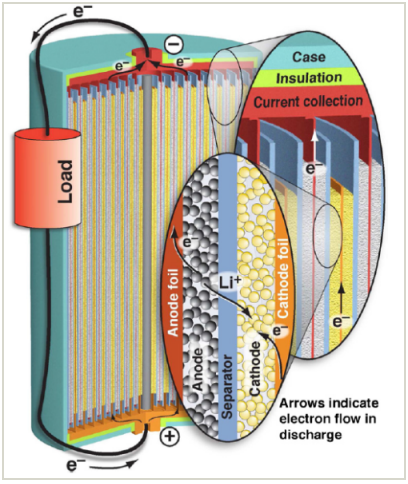
Images



Briefing Chart Image
Integrated Computational System for Electrochemical Device Design and Simulation, Phase II
(https://techport.nasa.gov/image/128485)



Final Summary Chart Image
Integrated Computational System for Electrochemical Device Design and Simulation, Phase II Project Image
(https://techport.nasa.gov/image/128449)

Technology Areas

Primary:

- TX09 Entry, Descent, and Landing
  - TX09.4 Vehicle Systems
    - TX09.4.5 Modeling and Simulation for EDL

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System